CROP PEST IN RED CLOVER CROP VS. WHITE SPONTANEOUS CLOVER

P. M. PUSTAI, I. OLTEAN, Teodora FLORIAN*

University of Agricultural Sciences and Veterinary Medicine from Cluj-Napoca, Faculty of Agriculture, Calea Mănăștur, No. 3-5, 400372, Cluj-Napoca, Romania
E-mail: *florian.teodora@yahoo.com

Abstract. *Usually, the society goal is to provide food supplies for humans especially from vegetable and animal farming products. The two agricultural productions are closely linked, so that crop production provides the forage basis for animals. Clover crops provide a high nutritional quality supply for animals therefore is considered one of the most important forage crops. Commonly used as a precursory culture, ensures high productions for the following crops, because the root contains bacteria-rich nodule which served for soil nitrogen storage. The present research was chosen taking into account the many advantages of Trifolium spp. crop and also the reason of pests' activity which is supposed to significantly reduce clover crop total production and seed. The aim of the study was primary selected for assessing the main phytophagous pest which has the major impact in decreasing seed production. To accomplish the research objective, samples were collected from an established surface of 2.5 ha in two different places located in Raciu area, Mures County. There were taken ten samples, each consisting of ten blossoms from red clover crop (Trifolium pratense) respectively from spontaneous white clover (Trifolium repens) belongs to grassland. The samples analyses were conducted in laboratory conditions by identifying pest species, their number and evolutionary stage with help of the binocular. Among the phytophagous species were identified: Apion apricans Herbst., Haplothrips niger Osb., Bruchophagus gibbus Boh., and Haplothrips tritici Kurd. Also they were reported and copies of Orius niger Wolff (zoofagă species). Among the biological material taken from the two stationary differences are observed in terms of the number exemparelor collected. In all species the largest number of specimens were collected from Trifolium repens. Thus, the species Apion apricans Herbst. on Trifolium repens were represented by 152 larvae, 256 pupa and 132 adults. On Trifolium pratense were reported 39 larvae, 15 pupa and 21 adults. The total number of Haplothrips niger Osb. catches was 924 specimenes on Trifolium pratense and 1152 specimenes on Trifolium repens. Bruchophagus gibbus Boh., species had 18 catches on Trifolium pratense and 164 catches on Trifolium repens.*

Keywords: *Apion apricans Herbst., Haplothrips niger Osb., Bruchophagus gibbus Boh.*

INTRODUCTION

Choosing an assortment of forage for each ecological zone is essential for achieving higher production of feed for different animal species (MOGA ET AL., 1983 SAICU, 2010).

Forage legumes play an important role in feeding ruminants, so by developing their culture can bring a high intake in livestock production. White clover and red clover grown spontaneously have an important contribution to increasing the quality and quantity of milk production compared with the pure cultures forages used for this purpose (DEWHURST ET AL. 2009).

Recent researches emphasizes that clover plants are abundant in biologically active substances, including numerous flavonoids, saponins, phenolic acids and clovamide. Red clover (*Trifolum spp.*), one of the most popular forage crop is used in the production of herbal medicines with therapeutic purposes as an alternative to conventional hormone replacement therapy. This plant extracts have antioxidant, anti-inflammatory; can inhibit angiogenesis and even cancer (KOLODZIEJCZYK-CZEPAS, 2012).

Clover culture is also an alternative to the inorganic fertilizers use (NYABUGA et al., 2015).

One of the biggest problems encountered in the cultivation on clover is the attack of various pests such as *Siton* spp., *Hypera* spp, *Apion* spp., *Haplothrips* spp., *Bruchophagus gibbus* Boh.

A challenge is represented by maintaining the attack of clover pest species at the limit of minimum damage, both the seed and the forage crop production. Red clover is the most severely attacked by these pests, with negative effect especially on seed production (ANDERSSON ET AL., 2012 MARKKULA ET AL., 1964).

Given the importance and benefits of this crop, the aim of this study was to identify abundance of pest species in red clover crop compared with spontaneously white clover to underlie of new forecasting and warning studies.

MATERIAL AND METHODS

Field experience was located in Raciu area, Mures County. Monitoring entomofauna attacking clover flowers was carried out in a culture of red clover (*Trifolium pratense*) and a natural white clover meadow (*Trifolium repens*). The size of the plots on which the samples were taken for analysis was 2.5 ha at a distance of 4 km from each other. From every field were taken ten samples, each sample being represented by 10 flowers. Sampling points were chosen randomly following a diagonal transect, respecting a distance of 35 m between sampling points (Fig. 1). Sampling was done on 10.06.2016 at second scythe. Identification of collected biological material was performed in the laboratory of Entomology, using the binocular. For each species was specified the stage of development.

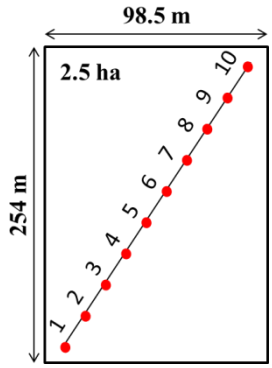

Fig. 1 Graphical representation of sampling points in plot

RESULTS AND DISCUSSIONS

In samples from the *Trifolium pratense* crop were found 1194 insects and it the *Trifolium repens* flowers were reported 3231 insects.

After analyzing the biological material, we found that the highest number of *Apion apricans* Herbs. specimens with a total of 540 individuals in various stages of development are located in *Trifolium repens* flowers compared with a total of 75 individuals per *Trifolium pratense* flowers (Table 1)..

Among the analyzed samples differences in terms of *Apion apricans* Herbs. number were reported. On *Trifolium pratense*, most specimens which have been identified were in the sample 3 and 5 with around 13 individuals/sample, most of them in the larval stage.

Trifolium repens had the biggest pest abundance in sample 3 summing up a total of 83 individuals, followed by sample 2 with a total of 66 individuals. In both samples the highest number was represented by adults.

In *Trifolium pratense* crop, all of *Apion apricans* Herbst. collected insect species represent 6% from the total number of catches (Fig. 2).

Table 1

Abundance of *Apion apricans* Herbs. pest in *Trifolium pratense* crop and *Trifolium repens* from spontaneous flora

	Trifolium pratense				***Trifolium repens***			
No. sample	**Larvae**	**Pupa**	**Adult**	**TOTAL**	**Larvae**	**Pupa**	**Adult**	**TOTAL**
1	5	0	0	**5**	22	5	28	**55**
2	0	1	0	**1**	27	7	32	**66**
3	7	2	4	**13**	21	11	51	**83**
4	2	2	0	**4**	15	19	17	**51**
5	8	4	1	**13**	17	11	20	**48**
6	3	1	6	**10**	12	18	31	**61**
7	2	0	1	**3**	12	21	29	**62**
8	5	0	3	**8**	11	13	28	**52**
9	6	2	1	**9**	9	18	11	**38**
10	1	3	5	**9**	6	9	9	**24**
TOTAL	**39**	**15**	**21**	**75**	**152**	**132**	**256**	**540**

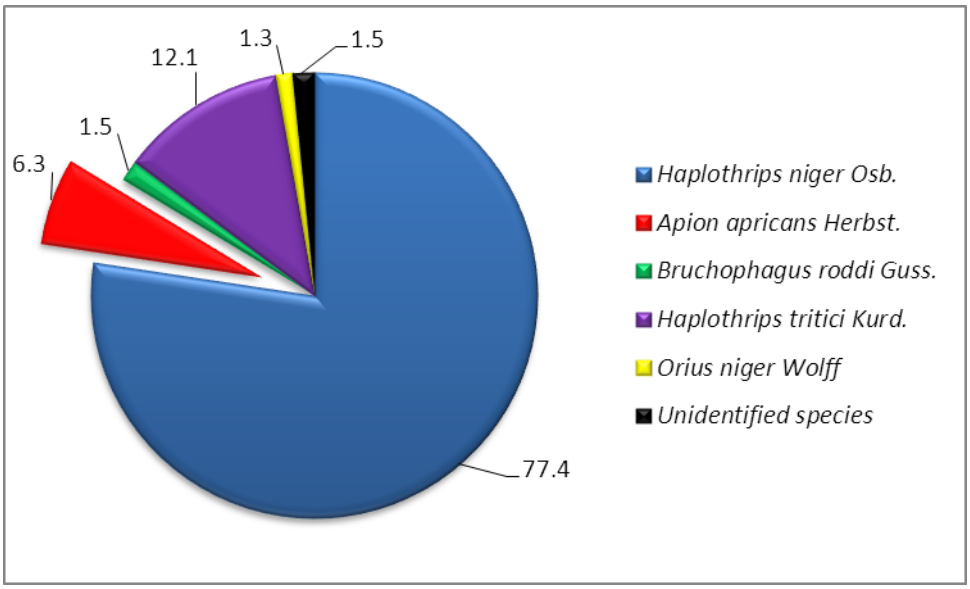

Fig. 2 Percent of *Apion apricans* Herbs compared to total collected insects from *Trifolium pratense* flowers

On *Trifolium repens* flowers, it was reported a much substantial entomofauna summing 3231 individuals in all ten samples, of which 540 belong to the Apion apricans Herbst. species. This represent 17% of entomofauna structure share (Fig. 3). Similar results were reported in other field studies by Saicu in 2010.

Haplothrips niger Osb., presented the highest number of catches in both clover plots. From *Trifolium pratense* flowers were collected 924 copies, of which approximately 67% were adults. Number of specimens/flowers ranged from 36 specimens (in sample 7) and 151 specimens (in sample 4). In the all ten samples of *Trifolium repens* he total number of trips was

1152 individuals, oscillating between 64 individuals/sample (sample 1) and 177 individuals/sample (sample 4). In all analyzed samples were predominantly adults (Table 2).

In the collected entomofauna structure from *Trifolium pratense*, thrips participates in a percent of 77.4% (Figure 2), and from *Trifolium repens* flowers in an amount of 35.7% (Fig. 3).

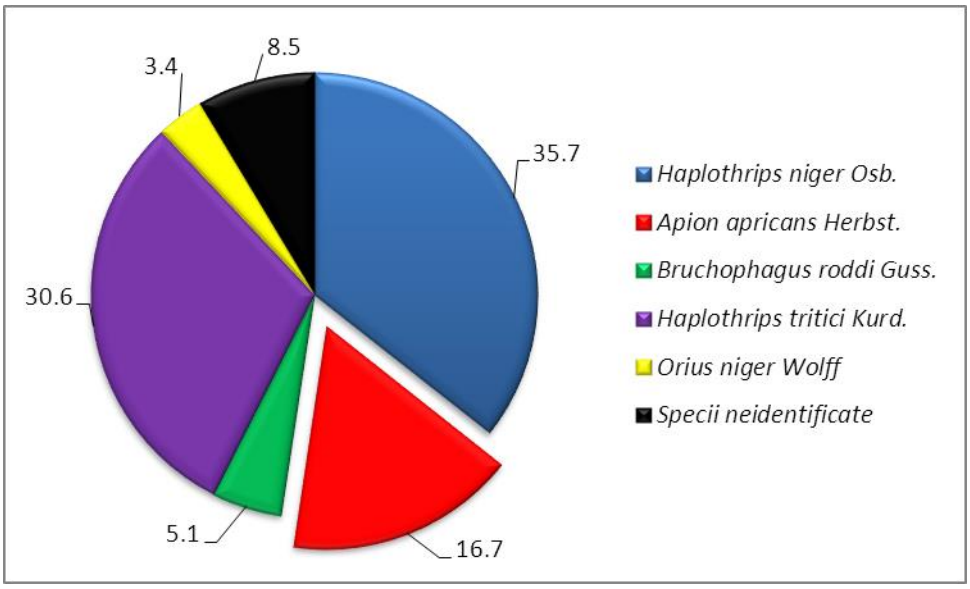

Fig. 3 Percent of *Apion apricans* Herbs compared to total collected insects from *Trifolium repens* flowers

Tabelul 2

Abundance of *Haplothrips niger* Osb. species in *Trifolium pratense* crop and *Trifolium repens* from spontaneous flora

	Trifolium pratense				***Trifolium repens***			
No. sample	**Larvae**	**Pupa**	**Adult**	**TOTAL**	**Larvae**	**Pupa**	**Adult**	**TOTAL**
1	7	2	31	**40**	11	9	44	**64**
2	9	1	47	**57**	15	10	49	**74**
3	21	11	73	**105**	28	17	81	**126**
4	37	13	101	**151**	37	19	121	**177**
5	43	5	90	**138**	49	21	73	**143**
6	18	2	61	**81**	21	14	81	**116**
7	4	4	28	**36**	20	14	46	**80**
8	23	8	59	**90**	31	12	71	**114**
9	33	13	79	**125**	44	18	81	**143**
10	28	19	54	**101**	31	22	62	**115**
TOTAL	**223**	**78**	**623**	**924**	**287**	**156**	**709**	**1152**

Another pest affecting seed production is *Bruchophagus gibbus* Boh. This species was reported in the lowest density number in the analyzed samples. In *Trifolium pratense* samples were reported 18 specimens. The species were reported only in 8 samples, the maximum number of individuals/sample was 4 (Table 3). Regarding the participation of this species in the collected entomofauna, it participates with a rate of 1.5% (Fig. 2).

However, in *Trifolium repens* crop the number of collected specimens was 164 individuals in various stages of development (Table 3). The structure of collected entomofauna

from white clover the seed wasp participated in a proportion of 5.1% (Fig. 3). In the analyzed samples were also reported representatives for *Haplothrips tritici* Kurd. and *Orius niger* Wolff.

Tabelul 3

Abundance of *Bruchophagus gibbus* Boh. species in *Trifolium pratense* crop and in *Trifolium repens* from spontaneous flora

	Trifolium pratense				***Trifolium repens***			
No. sample	**Larvae**	**Pupa**	**Adult**	**TOTAL**	**Larvae**	**Pupa**	**Adult**	**TOTAL**
1	0	0	2	**2**	5	1	9	**15**
2	0	0	0	**0**	1	7	5	**13**
3	0	0	1	**1**	8	2	7	**17**
4	0	0	4	**4**	4	9	8	**21**
5	0	2	0	**2**	3	4	6	**13**
6	0	0	1	**1**	9	4	7	**20**
7	0	1	1	**2**	8	7	9	**24**
8	1	0	0	**1**	5	6	3	**14**
9	0	4	1	**5**	1	4	8	**13**
10	0	0	0	**0**	6	4	4	**14**
TOTAL	**1**	**7**	**10**	**18**	**50**	**48**	**66**	**164**

CONCLUSIONS

1. Numerical entomofauna density is higher on white clover from spontaneous flora compared to red clover crop.
2. On natural grasslands is a biological pool for pests that attacks generative organs of clover species.
3. The dominant species in both fields was *Haplothrips niger* Osb. followed by *Apion apricans* Herbs.
4. In pest control programs from clover seed lots it is recommended to offer protection for the zoophagous species *Orius niger* Wolff.

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